(13) Appeal Brief 10-25-03

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| Applicant: Carroll et al. | Group Art Unit: 2878 |
| Serial No.: 09/782,089 | Examiner: Daniel St Cyr |
| Filed: February 12, 2001 | |
| Title: *Automated Reactor Endpoint of Platy Interference Effect Pigment* | Atty. Docket No.: 4629 |

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## APPEAL BRIEF

Commissioner of Patents
and Trademarks
PO Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from the Final Rejection dated January 16, 2003.

## REAL PARTY IN INTEREST

The real party in interest of this application is Engelhard Corporation.

## RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

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## STATUS OF CLAIMS

Claims 1-12, all of the claims present in this application have been Finally Rejected and are the subject of this appeal.

## STATUS OF AMENDMENTS

A request for reconsideration filed May 27, 2003 did not propose any amendments to the specification or claims. This request was entered by the Examiner but was stated as not placing the application in condition for allowance in a paper filed June 12, 2003.

## SUMMARY OF INVENTION

The present invention is directed to an apparatus and a method for objectively ascertaining a color match between a selected standard color and the color exhibited by an interference effect pigment slurry during the preparation of the pigment, and terminating the preparation upon achieving a proper color match, page 4, lines 12-15.

Interference effect pigments, also known as pearlescent pigments, or macreous pigments, are based on platy substrates which have been coated with a metal oxide layer or layers. These pigments exhibit a pearl-like luster as a result of multiple reflections and refractions of light as light encounters the various layers which constitute the pigment, page 1, lines 16-21. The interference effect pigments are made by forming a hydrous layer on a substrate such as mica followed by calcining the composite. The color generated by the pigment is a function of the optical thickness of the coating, which in turn is a function of the refractive index of the coating and physical thickness of the coating. The physical thickness of the coating is a function of the coating process and the parameters and conditions of the process, page 1, line 22 – page 2, line 5.

The ultimate color of the interference pigment product is complicated by the fact that free particles of the coating, unattached to the platy substrate, can form and effect the apparent color. Importantly, the color of the effect pigment changes rapidly as a result of high reaction rates as the hydrous coating is applied to the platy substrate. To use known methods of color monitoring, the manufacturing process must be halted, a sample of the in-process material obtained and dried, and also calcined if the end product is intended to be calcined, and then the resulting color characteristics must be compared to a standard, page 2, lines 6-13. Accordingly, to accurately monitor color, it would be necessary to obtain and dry a sample of the pigment suspended in a coating carrier, and coat a color evaluation substrate before evaluating the color. This is impractical and time consuming. Typically, therefore, interference effect pigment processing involves a simple, subjective visual observation of the pigment dispersion as the hydrous coating is being formed on the substrate, and maintaining the processing conditions as close to predetermined parameters as practical, page 2, lines 14-21.

The present invention provides an apparatus and method for objectively ascertaining a color match between a selected standard color and the color exhibited by an interference effect pigment dispersion during pigment preparation so as to allow terminating the preparation upon achieving a match, page 2, lines 22-25. To monitor the interference effect pigment color during the processing thereof, and to terminate the processing when the desired color is found, an apparatus is provided that includes a flow cell that receives a pigment dispersion from a reaction flask or reactor in which the interference effect pigment is being produced, page 4, lines 15-17. The flow cell 20, see Figure 1, receives a stream of the pigment dispersion from the reactor as it is produced. As shown in Figure 1, a goniospectrophotometer 10 is provided which is capable of measuring at an angle 12 the interference color of the pigment dispersion 22 that is

passing through the flow cell 20. The goniospectrophotometer monitors the pigment color of the pigment dispersion 22 during development of the interference pigment and, in particular, during the application of the hydrous layers on the platy substrate, in real time. This reduces the time in which a pigment dispersion is held during evaluation and prior to completion. A description of Figure 1 is provided at page 5, lines 3-24. When the goniospectrophotometer measures a color from the pigment dispersion flowing through the flow cell that matches a standard for the particular color desired, the pigment forming process in the reactor can be halted, page 7, lines 14-15. In this manner, conventional monitoring processes which involve obtaining, filtering, and calcining a sample which is then suspended in a carrier and drawn over a substrate for color comparison can be avoided. The present invention eliminates these time consuming steps, page 5, line 25 –page 6, line 5. Further, in addition to reducing holding time, the invention also provides for an objective evaluation of product color, page 6, lines 6-7.

## ISSUES

Whether claims 1-6 drawn to an apparatus and claims 7-12 drawn to a method have been properly rejected under 35 USC 103(a) as being unpatentable over Asaba et al., U.S. Patent No. 6,249,751, in view of Abu-Shumays et al., U.S. Patent No. 4,181,853. It is Appellants' position that two issues are raised in the Final Rejection by application of the aforementioned prior art. (1) Whether the Examiner had a proper basis for combining the secondary reference of Abu-Shumays et al. with the primary reference of Asaba et al., and (2) whether, even if the combination of references is proper, does the combination render the claimed apparatus and the method obvious under 35 USC 103(a).

## GROUPING OF CLAIMS

Claims 1-6 are considered separately patentable from method claims 7-12. Further, claims 4, 5, and 6 are separately patentable from claim 1. Still further, claims 10, 11, and 12 are separately patentable from claim 7.

## ARGUMENT

Claims 1-6, drawn to an apparatus, and claims 7-12, drawn to a method, have been finally rejected under 35 USC 103(a) as being unpatentable over Asaba et al. (U.S. 6,249,751) in view Abu-Shumays (U.S. 4,181,853). The Examiner states that Asaba et al. discloses a method of measuring gonio-spectral reflectance factor comprising a goniospectrophotometer, a computer which is provided with a function of generating random numbers, a function of controlling a measuring device of a goniospectrophotometer, etc. The Examiner states that Asaba et al. fails to disclose or fairly suggest a flow cell for providing a sample of the pigment. The Examiner applies Abu-Shumays et al. as disclosing a liquid chromatography system with a packed flow cell for improved fluorescence detection. The Examiner concludes that in view of the secondary reference to Abu-Shumays, it would have been obvious for a person of ordinary skill in the art to incorporate a flow cell into the system of Asaba et al. for storing the pigment sample "so that a more condense and concentrated sample is provided for optimal component resolution to facilitate color detection." The Examiner states that such modification "would enhance the color detection process by providing more effective color matching."

*Rejection Based on 35 USC 103(a) is improper since the primary reference and the secondary reference are not properly combinable.*

The ultimate objective of the primary reference to Asaba et al. is to render a precise three-dimensional computer graphics image, column 1, lines 9-11 and 51-55. Asaba et al. achieves the rendering of a three-dimensional computer graphics image by utilizing a goniospectrophotometer to provide a database of colors of a coating. At column 1, lines 51-55, the primary reference states that for forming a highly-fine realistic rendering image in accordance with actual colorimetry data in three-dimensional computer graphics, the gonio-spectral reflectance factor measure in every viewing direction is required. As further stated, that means that the reflectance factors of light having as many wavelengths as possible and as many directions as possible are gathered in order to reproduce a reflectance factor distribution of the actual object. Accordingly, about several thousand to about ten thousands of viewing directions by using the goniospectrophotometer are required, column 1, lines 59-65. As such, much time and considerable effort is needed for subjecting many surface colors of the coating to the colorimetry. The primary reference states in column 2, lines 3-7, that the need for obtaining such data is a bottleneck in the creation of the database of colors. The invention as disclosed in the primary reference is directed to a method of measuring gonio-spectral reflectance factors for use in generating a database of colors of a coating for forming a three-dimensional computer graphics image wherein light reflected from a measured specimen is subjected to colorimetry in a plurality of viewing directions selected at random from all directions that can be viewed by a goniospectrophotometer, the plurality of viewing directions being less than all the directions than can be viewed by a goniospectrophotometer, column 2, lines 40-48. The apparatus for determining all the colors of reflective light from a sample is described at column 9, lines 35-48 in a description of Figure 9. The apparatus comprises a goniospectrophotometer which contains an illuminator 7, a specimen rotating table 8, and a spectroscope 9. In general,

the specimen 15 is placed upon the rotating table 8, and a computer generates random angles at which the goniospectrophotometer would measure the light reflected from the coating on the specimen. The specimen rotating table 8 can be rotated around a vertical axis, and a horizontal axis whereby the viewing angle can be changed, column 9, line 65 – column 10, line 5. The database which is generated from the colorimetry developed from the specimen can be used to form a precise 3-D graphic on a computer such as the automotive graphic shown in Figure 10.

The secondary reference to Abu-Shumays is directed to a liquid chromatography system. In liquid chromatography, a sample is separated into its component parts for detection of one or more components of the sample. Chromatography is a well known separation technique used to detect particular chemicals. In the process of the secondary reference, an elutant from a chromatographic column is passed through a detector flow cell which is packed with a stationary phase that is adsorptive of the eluting species. Detection of the species thereby adsorbed at the stationary phase may be effected by measuring the fluorescence emitted from the adsorbed species, column 2, lines 45-55.

The applied primary reference to Asaba et al. and the applied secondary reference to Abu-Shumays are directed to grossly different technologies. The Examiner's conclusion that it would be obvious to incorporate a flow cell into the system of Asaba et al. "so that a more condense and concentrated sample is provided" is an objective not remotely suggested by the primary reference. Further, the primary reference requires a sample holder which can be rotated and manipulated so that numerous viewing angles of light reflected from the sample can be provided. A stationary packed flow cell for use in chromatography as in Abu-Shumays is certainly not such a sample holder. One skilled in the art disclosed by Asaba et al. would certainly not look to the chromatography art in the secondary reference to find a

substitute for the rotating table which holds the specimen in the primary reference. Further, the packed flow cell of Abu-Shunays would not allow a distinct reflection of light from a sample coating in as much as even if the sample coating could flow through the cell, the mixture of the packing with the sample coating would not provide the pure color which is desired by the primary reference to Asaba et al. Accordingly, it is Appellants' position that the application of Abu-Shumays is improper, as one of ordinary skill in the art of graphic design for generating a color database as in the primary reference would not remotely look to the liquid chromatography art as in the secondary reference, and, in particular, to the packed flow cell of the secondary reference. For this reason alone, the combination of references used to form a rejection under 35 USC 103 (a) is improper and, as such, it is respectfully requested that the final rejection based on 35 USC 103 (a) be reversed.

*The combination of Asaba et al. and Abu-Shumays et al., even if proper, does not render the claimed apparatus and the claimed method obvious under 35 USC 103 (a).*

The claimed apparatus is for controlling the color of an interference effect pigment during the preparation of the pigment. The apparatus includes "an interference effect pigment reactor." The primary reference to Asaba et al. does not disclose such a reactor. Asaba et al. is not concerned with an apparatus for controlling a manufacturing process. Asaba et al. discloses an apparatus for forming a data bank of colors so that a very fine three-dimensional computer graphic image can be formed. The only similarity between the claimed apparatus and that of Asaba et al. is the presence of a goniospectrophotometer. Accordingly, even if it was proper to combine the flow cell of the secondary reference to Abu-Shumays et al., the combination of references would still not meet the claimed apparatus since the combination of references would not read on an

interference effect pigment reactor. Importantly, the particular structure of the flow cell as set forth in claims 4, 5, and 6 would not be met by the packed flow cell of the secondary reference. Thus, claim 4 recites the flow cell is a thin layer flow cell and claims 5 and 6 specify particular dimensions of the flow cell which are not remotely disclosed in any of the applied references. Further, the flow cell recited in claim 1 is adapted to "receive and orient a sample of pigment." The packed flow cell of the secondary reference could not receive or orient a solid such as that claimed. The <u>packed</u> flow cell of the secondary reference is for liquid flow.

The claimed method is directed for <u>controlling</u> the color of an interference effect pigment during pigment preparation whereby the pigment during its preparation is forwarded to a flow cell, light is impinged on the sample in the flow cell, and a characteristic of the light reflected from the pigment is <u>compared</u> with a standard. Asaba et al. is not remotely concerned with controlling the color of an interference effect pigment during pigment preparation. Asaba et al. is concerned with a method of obtaining a color database of a coated specimen at a variety of viewing angles so that the color database can be used to provide a very fine 3-D computerized graphic image. In Asaba et al., there is no color matching or comparing. Asaba et al. is simply concerned with forming a large color database. The primary reference is concerned with a process wholly different from that claimed. The addition of the flow cell of Abu-Shumays et al. would not make up for the deficiency of the primary reference of controlling the color of an interference effect pigment during the pigment preparation. The combination of references certainly would not teach the limitations of claim 10, wherein the sample is mica coated with a high refractive index material, the limitation of claim 11, wherein the process of forming the pigment is terminated when the light characteristic corresponds with the standard, or with the limitation of claim 12, wherein the flow cell is a thin layer

flow cell. While Asaba et al. may test and form a database of colors from a color sample which contains an interference effect pigment, the patent is not remotely concerned with an apparatus or method involved in actually producing the interference effect pigment. Accordingly, even if the combination of references were proper, as is stated above, there is absolutely no reason why one of ordinary skill in the art of forming color effect pigments would combine the grossly diverse teaching of the primary and secondary reference, the combination of references still would not suggest the claimed apparatus and method for forming an interference effect pigment. The combination of references merely teaches the combination of a goniospectrophotometer and a flow cell. The claimed apparatus and method are more than these two components. Appellants respectfully request that the rejection of claims 1-12 based on 35 USC 103 (a) be reversed.

## CONCLUSION

In view of the above, Appellants respectfully request the Board of Appeals to reverse the final rejection of claims 1-12 over the applied combination of references. An appendix to this appeal brief sets forth claims 1-12, which are on appeal.

Oct 16, 2003
Date

Respectfully submitted,

Stuart D. Frenkel
Reg. No. 29,500

Law Office of Stuart D. Frenkel, P.C.
3975 University Drive, Suite 330
Fairfax, VA 22030
Telephone (703) 246-9641
Facsimile (703) 246-9646

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Invention: **Automated Reactor Endpoint of Platy Interference Effect Pigment**

I hereby certify that this **Appeal Brief**

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